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EXAMINER

TAOUSAKIS, ALEXANDER P

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of claims 4-5 in the reply filed on 12/07/2009 is acknowledged. The traversal is on the ground(s) that unity of invention rests with the International Searching Authority and a decision has already been made. This is not found persuasive because a decision by the International Searching Authority doesn't preclude the Examiner from making a unity of invention claim in the corresponding national stage application.

Also, the Applicant argues that there are no teachings within Hoyes or Oyelayo et al why they should be combined. This is not found persuasive because Oyelayo teaches that the carbide coating improves wear resistance and increases pitting resistance (*see paragraph [0001]*).

Applicant argues that tempered ductile iron is common to all claims. This is not found persuasive because the method claims do not positively require "tempered ductile iron."

Applicant argues that the product would be uniformly treated, and not partially treated due to local differential thermal treatment. This is not found persuasive because "local differential" treatment doesn't necessarily involve a partially treated workpiece, as the local treatment could be "local" to the combined drive gear wheel and crankshaft as opposed to other engine components. Therefore, a uniformly coated combined drive gear wheel and crankshaft can also have local different differential thermal treatment.

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Applicant argues that all the claims require either local differential heat treatment or peening, and therefore all the claims involve the same special technical features.

This is not found persuasive because the specification hasn't clearly set forth how differential treatment will differ from heat treatment as disclosed in Hoyes, therefore it is unclear how the two treatments would result in a structurally different combined crankshaft and gear wheel. Since the structural differences cannot be determined, then the product by process claims of Group I do not make a contribution over the prior art.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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**Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over
Hoyes et al (WO 0047362) in view of Wilde et al (6,258,180), further in view of
Oyelayo et al (2002/0098392).**

4-5, 7-9, 11-13 Hoyes et al teaches, wherein the diesel engine includes a crankshaft with combined drive gear wheel (*see Figure 1, column 1 lines 1-2, and note that it is inherent that the diesel engine will be used for a diesel vehicle*), and wherein crankshaft and gear wheel are hardened (*see column 1 lines 21-22*).

The limitations, “wherein the hardness of the gear wheel is further increased by local differential thermal treatment during ADI heat treatment and/or by peening, wherein both the crankshaft and drive gear wheel are cast as one piece” is being treated as a product by process limitation. As set forth in MPEP 2113, product by process claims are NOT limited to the manipulations of the recited steps, only to the structure implied by the steps. Once a product appearing to be substantially the same or similar is found, a 35 U.S.C. 102/103 rejection may be made and the burden is shifted to applicant to show an unobvious difference See MPEP 2113.

The structure implied by the above process steps is a crankshaft combined with a drive gear wheel manufactured from tempered ductile iron (ADI), has been heat treated and at least the gear teeth having a carbide containing coating (CADI).

Hoyes et al fail to teach wherein the crankshaft and drive gear wheel are manufactured from tempered ductile iron (ADI) and have a carbide containing coating (CADI).

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Wilde et al teaches producing a crankshaft out of an austempered ductile iron (see *column 2 lines 55-60, where it discloses producing crankshafts, and see column 4 lines 4-12*).

Oyelayo et al teach a carbide coating deposited on gear teeth (see [0029]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to produce the crankshaft/drive gear wheel of Hoyes et al out of an austempered ductile iron, as taught by Wilde et al, because it has exceptional strength and toughness (see *Wilde et al column 2 lines 23-25*). Furthermore, it would have been obvious to provide a carbide coating onto the gear teeth of Hoyes et al, as taught by Oyelayo et al, because it will increase its surface hardness and wear resistance.

7 and 11. Hoyes et al/Wilde et al/Oyelayo et al teach the product of claim 4, wherein the gear wheel is hardened (see *Hoyes et al page 2 lines 8-12*) and note that “wherein the hardness of the gear wheel is further increased by local differential thermal treatment during ADI heat treatment” is being treated as a product by process limitation. Once a product appearing to be substantially the same or similar is found, a 35 U.S.C. 102/103 rejection may be made and the burden is shifted to applicant to show an unobvious difference See MPEP 2113. The resulting structure of thermal treatment is a heat treated gear wheel, which Hoyes et al meets. Note that including the term "local" before

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thermal treatment does not further limit the claim because the heat treatment can be "local" to the entirety of the gear wheel and crankshaft as it does state that the combined gear wheel itself is being hardened.

8, 9, 12, 13. Hoyes et al/Wilde et al/Oyelayo et al teach the product of claims 7 and 11, but fail to teach wherein carbide is within the microstructure of the combined gear wheel and crankshaft. Note that the claim is being treated as a product by process claim, as described above, and the resulting structure is carbides throughout the thickness of the part.

Wilde et al teaches uniformly dispersing carbides throughout the microstructure of an ADI part to form a part having carbides throughout its thickness (*see column 3 lines 66-67 – column 4 lines 1-12*).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to create a part having carbides within its microstructure, as taught by Wilde et al, because it improves hardness and wear resistance (*see Wilde et al column 1 lines 64-65*).

Claims 10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoyes et al (WO 0047362) in view of Wilde et al (6,258,180), further in view of

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Oyelayo et al (2002/0098392) as applied to claims 4 and 5 above, further in view of Kawanami et al (5,409,415).

10 and 14. Hoyes et al/Wilde et al/Oyelayo et al teach the product of claims 4 and 5, but fail to teach shot peening the combined gear wheel.

Kawanami et al teaches shot peening a gear wheel to form a shot peened gear wheel (*see column 7 lines 56-68 - column 8 lines 1-4*).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a shot peened gear wheel, as taught by Kawanami et al, because it prolongs the fracture limit due to fatigue, stress corrosion or intergranular corrosion of the metal (*see Kawanami et al column 8 lines 1-4*).

Response to Arguments

Applicant's arguments filed 08/16/2010 have been fully considered but they are not persuasive.

Restriction Requirement: Note that the restriction requirement was deemed proper and made Final in the previous office action, and further responses to applicant's arguments pertaining to the restriction requirement are included above.

The applicant argues that the claimed invention involves a different microstructure than that of Hoyes et al. This is not found persuasive because claims 4-5 do not explicitly claim a specific microstructure.

Applicant argues that the carbide coating of Oyelayo can only be applied prior to cutting teeth. This is not found persuasive because Oyelayo is used as a general teaching of applying a carbide coating on a given part, where this carbide coating may be applied at any stage of the production process, including after the gear teeth are cut.

Applicant argues that Hoyes et al heat treatment prior to cutting the gear teeth. This is simply not correct; see Hoyes et al page 1 lines 16-22.

Applicant argues that Oyelayo fails to teach incorporating carbide into the alloy. This is not found persuasive because claims 4-5 do not require a carbide formed into the alloy, rather *new* claims 8-9 and 12-13 require such a limitation. Note that these claims have been remedied with a new ground of rejection as discussed above.

Applicant argues that Oyelayo fails to selectively harden only the gear teeth. This is not found persuasive because the claim is not restricted to hardening of the gear teeth only, but instead may be construed to teach an entire combined gear wheel and crankshaft which is hardened, along with the gear teeth.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEXANDER P. TAOUSAKIS whose telephone number is (571)272-3497. The examiner can normally be reached on M-F 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bryant can be reached on (571) 272-4526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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